

Regional Haze Update

Clean Air Act Advisory Group meeting

May 1, 2006

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KDHE BAR – Monitoring and Planning

Overview

- CENRAP status
 - Modeling workgroup update
 - Implementation and Control Strategies (ICS) workgroup update
- KS BART modeling... the early results
- Timelines - review
- Next steps
- Your thoughts

CENRAP Modeling Workgroup

- 2018 visibility projections underway
 - Looking at the uniform rate of progress (RPG) line
 - Most interior CENRAP Class I areas achieve 2018 RPG
 - Class I areas on international borders fail to achieve RPG
 - Mex/Can emissions assumed unchanged 2002/2018
- 2018 36 km modeling being performed now
 - 2018 visibility projections
 - Using both the current and new IMPROVE equation
- Source apportionment modeling for SO₄, NO₃, and PM
 - PSAT- Particulate Source Apportionment Technology
 - Geographic PM Source Apportionment (e.g., States)
 - Just started these analyses

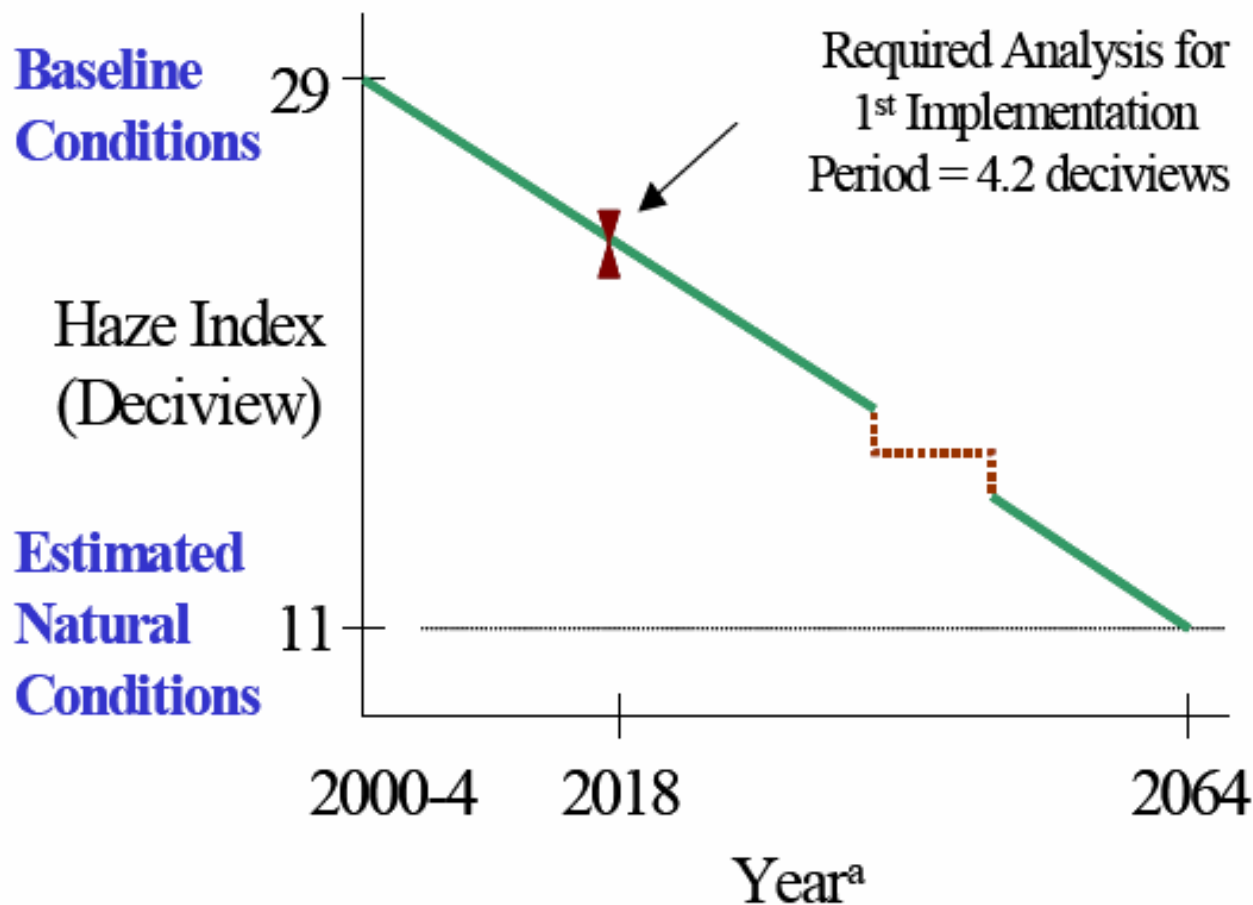
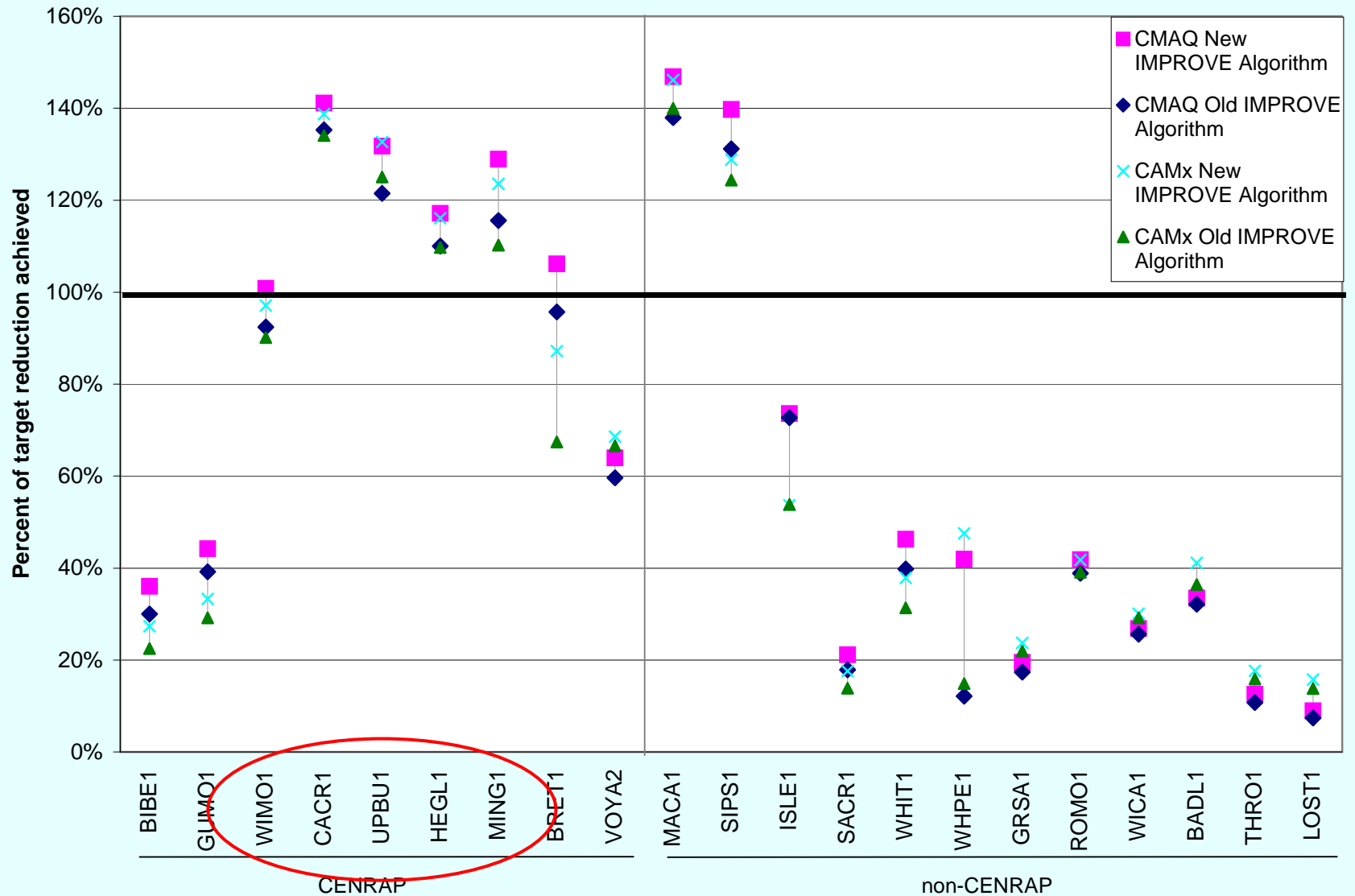


Figure 1-1 Example of method for determining mandatory Federal Class I area rate of progress to be analyzed in SIP development process.
(^a HI values for 2004 are based on 2000-2004 data, etc.)

Base18d/Typ02b Method 1 predictions for CENRAP+ sites



CENRAP Modeling Workgroup (cont'd)

- Next steps
 - Perform source apportionment runs
 - Provides State contribution to visibility impacts (results in 2 weeks)
 - Model the effect of “estimated BART” controls
 - Model effects of regional EGU reductions
 - Model ICS workgroup-recommended control scenarios
 - Currently being developed

CENRAP ICS Workgroup

- Reasonable progress
- Control scenarios to evaluate further
- Estimated BART emissions reductions
 - Finished first cut

CENRAP ICS Workgroup (cont'd)

■ Reasonable Progress

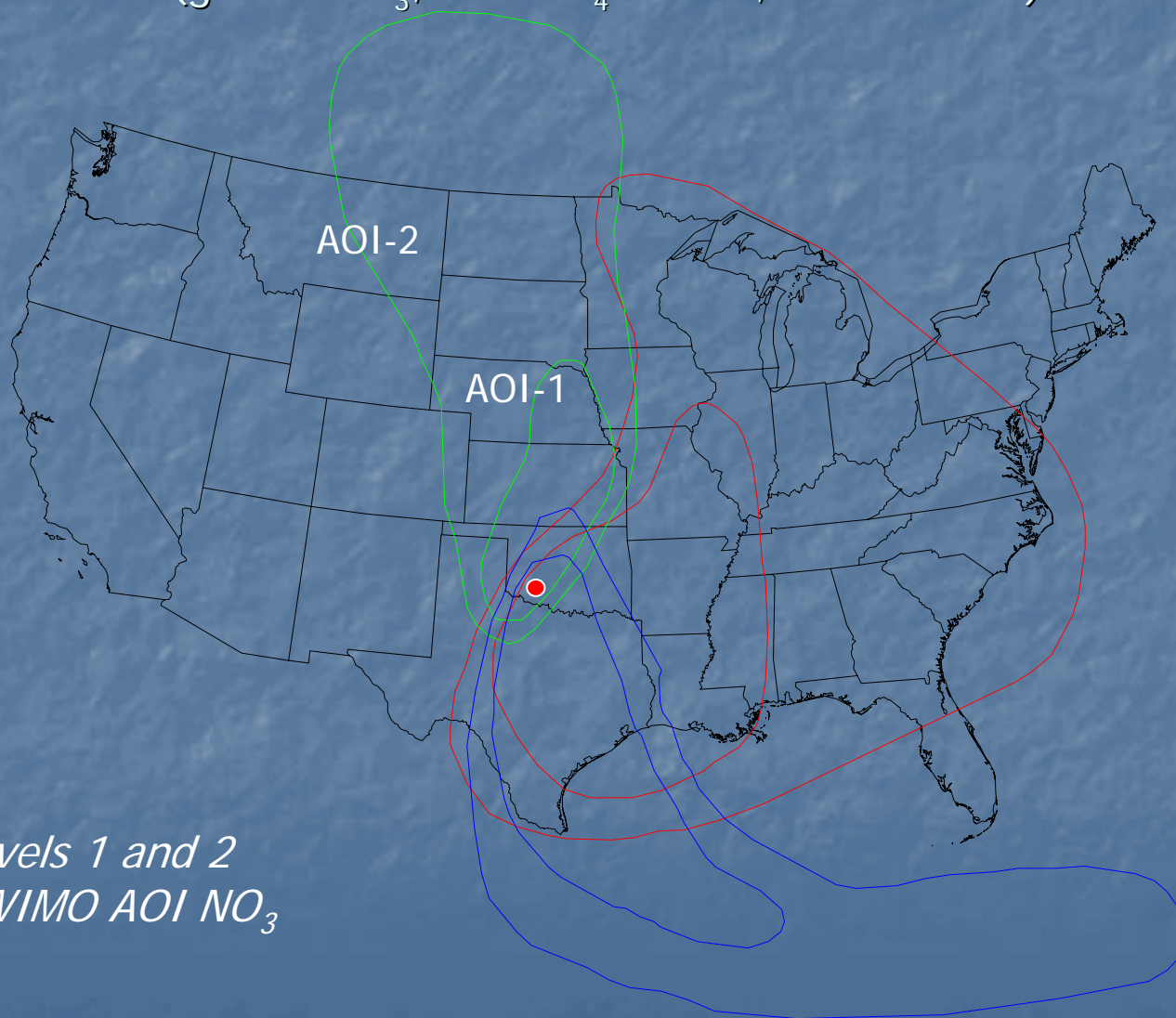
- Address non-BART sources
- EPA draft guidance released 11-28-05
- Reasonable progress should ensure visibility conditions at or better than uniform rate of progress
- Four statutory factors identified
 1. The costs of compliance
 2. The time necessary for compliance
 3. The energy and non-air quality environmental impacts of compliance
 4. The remaining useful life of existing sources that contribute to visibility impairment
- *Note factors do not include visibility impacts on Class I areas*

CENRAP ICS Workgroup (cont'd)

- Preparing recommendations for control strategy runs for modeling group
 - Based on “areas of influence” (AOIs) developed by Alpine Geophysics
 - Determined chiefly from back trajectories
 - Emissions impact potential
 - One recommendation is region-wide EGU reductions
 - Recommended by other states
 - Cost of controls is a key factor
 - BART impacts not currently included
 - Recommendations for further modeling analysis only!!!

Wichita Mountains AOIs

(green= NO_3 ; red= $\text{SO}_4/\text{EC}/\text{OC}$; blue=CM/FS)



*Note AOI levels 1 and 2
shown for WIMO AOI NO_3*

Example of Control Analysis

- Start with the county list from AOI-1
- Identify sources available for potential control
 - For example, >250 ton/yr of a single pollutant
- Apply all available control technologies to each potential source of reduction
 - Limit sources by parameters such as geography, residual contribution, etc.
- Incrementally sort reductions and costs by marginal cost from one control to the next
 - Eliminate technologies that are not as cost-effective as next highest

Example of Control Analysis (cont'd)

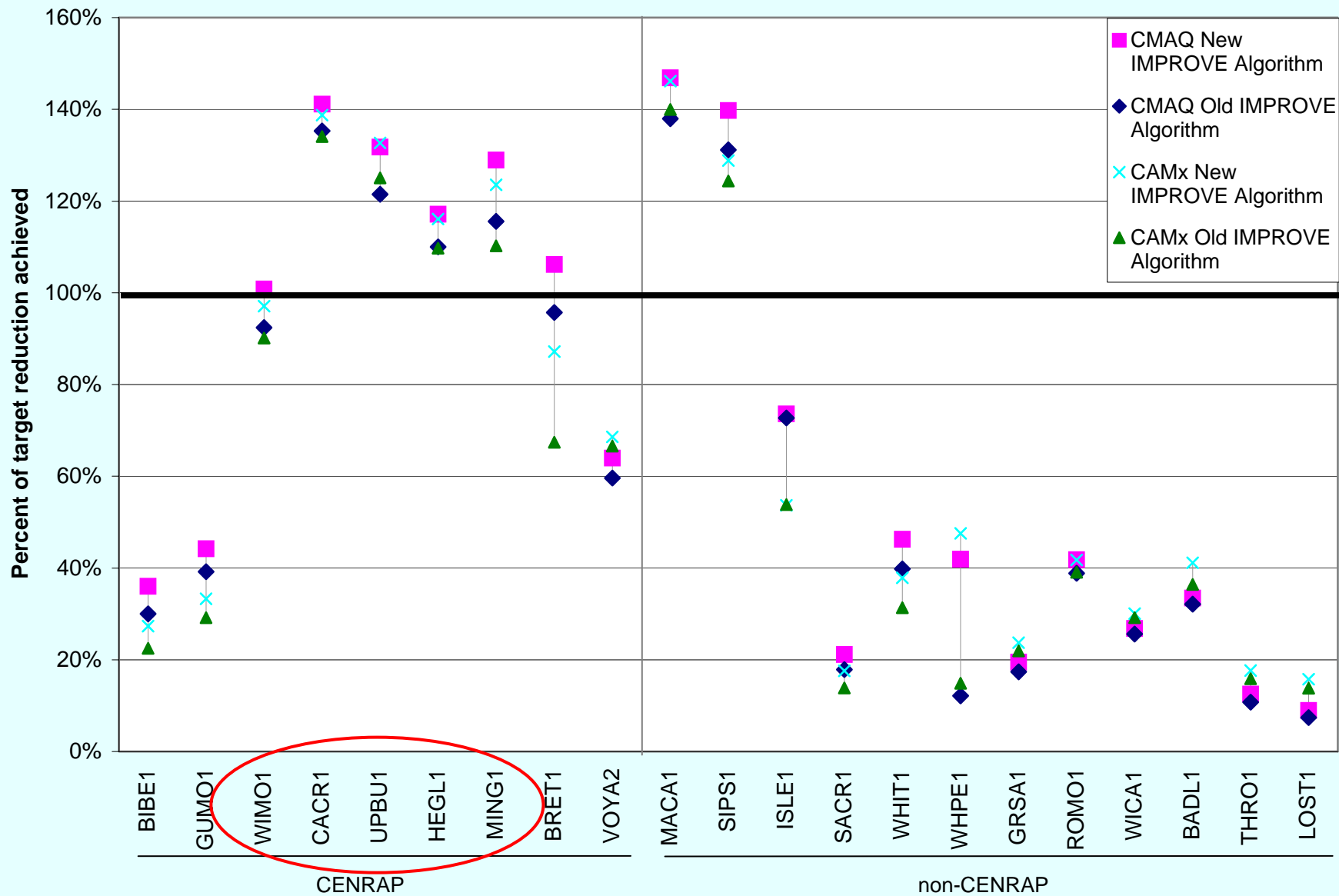
- Develop incremental cost curve for AOI-1, sources, and pollutants of interest
- Use desired reduction value from reduction needs analysis (based on modeling) to pick emission reduction requirement
- Locate emission reduction target on cost effectiveness curve
- Assign controls associated with cost curve selection across all sources
- *Recommend* control scenarios to evaluate further

Wichita Mountains AOI-1 SO₄

Wichita Mountains AOI-1 SO₄ Residual Emissions Contribution

2018 Base Case Annual SO ₂ Emissions				
Tier 1	Tier 2	Source Category	Tons	% of Total
01	01	Fuel Comb. Elec. Util.-Coal	1,086,553	49%
01	02	Fuel Comb. Elec. Util.-Oil	870	0%
01	03	Fuel Comb. Elec. Util.-Gas	10,257	0%
01	04	Fuel Comb. Elec. Util.-Other	492	0%
01	05	Fuel Comb. Elec. Util.-Internal Combustion	326	0%
02	01	Fuel Comb. Industrial-Coal	232,258	10%
02	02	Fuel Comb. Industrial-Oil	124,848	6%
02	03	Fuel Comb. Industrial-Gas	90,898	4%
02	04	Fuel Comb. Industrial-Other	14,902	1%
02	05	Fuel Comb. Industrial-Internal Combustion	981	0%
04	01	Chemical & Allied Product Mfg-Organic Chemical Mfg	6,104	0%
04	02	Chemical & Allied Product Mfg-Inorganic Chemical Mfg	63,351	3%
04	03	Chemical & Allied Product Mfg-Polymer & Resin Mfg	503	0%
04	04	Chemical & Allied Product Mfg-Agricultural Chemical Mfg	20,938	1%
04	05	Chemical & Allied Product Mfg-Paint, Varnish, Lacquer, Enamel Mfg	14	0%
04	06	Chemical & Allied Product Mfg-Pharmaceutical Mfg	207	0%
04	07	Chemical & Allied Product Mfg-Other Chemical Mfg	123,405	6%

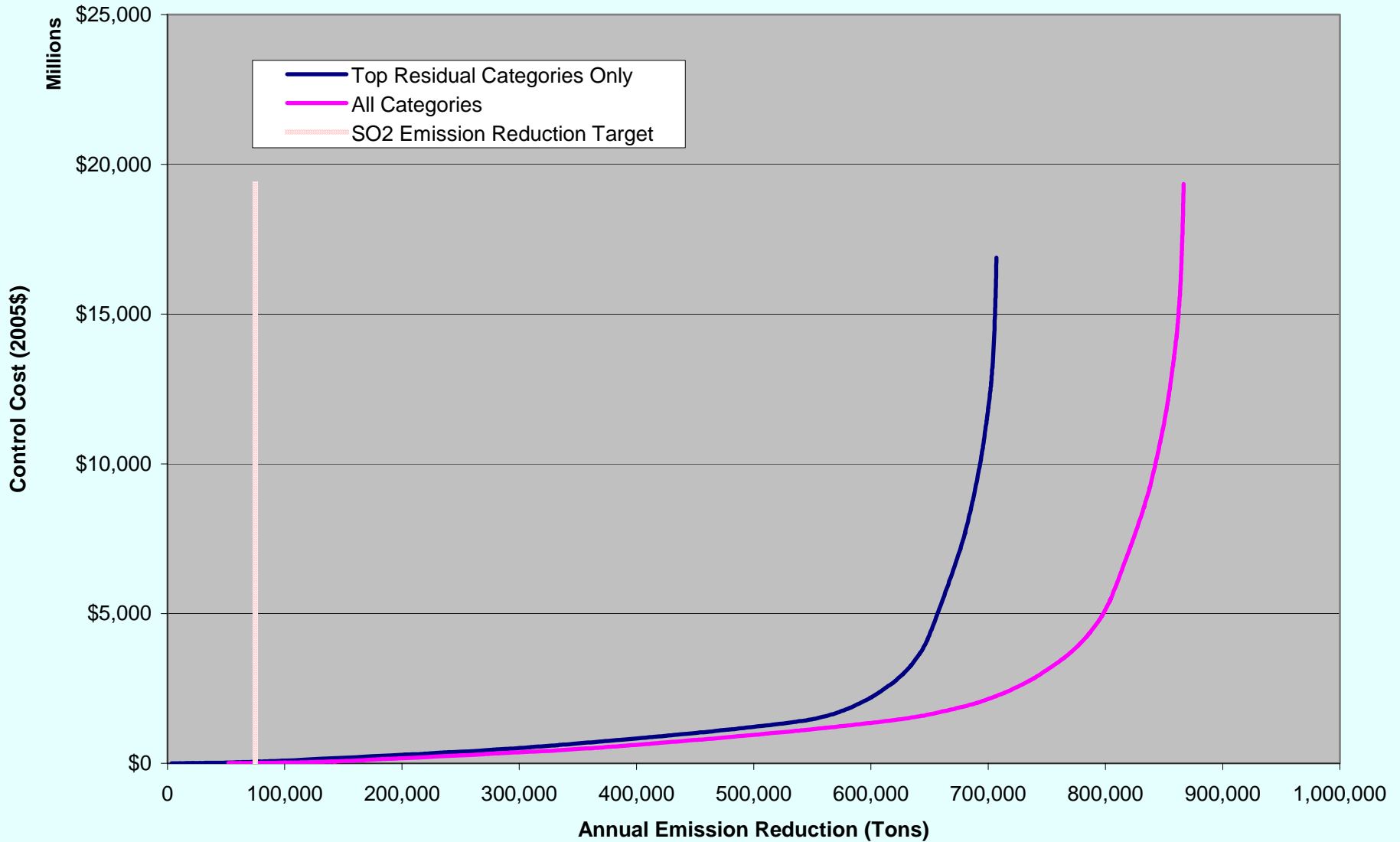
Base18d/Typ02b Method 1 predictions for CENRAP+ sites



Emissions Reductions Needed to Yield Desired Concentration Reductions Based on Reduction in a Single Precursor

Class I Area	ST	Reduction Requirement Assuming Single Species Control (ug/m3)						Level 1 AOI		Required SO2 Emissions Reductions (tons / year)	Required NOX Emissions Reductions (tons / year)
		Sulfate	Nitrate	OC	EC	Soil	Coarse	sulfate-to-SO2 (ug/m3/ton reduced)	nitrate-to-NOX		
Big Bend Nat'l Park	TX	1.25	1.25	1.97	0.79	7.88	13.13	-0.004	-0.002	110,000	230,000
Boundary Waters	MN	0.51	0.51	1.27	0.51	5.08	8.46	-0.006	-0.002	31,000	94,000
Breton Island	LA	0.12	0.12	0.33	0.13	1.31	2.19	-0.002	-0.00008	21,000	530,000
Caney Creek	AR							-0.003	-0.0004		
Guadalupe Mountains	TX	1.34	1.34	1.81	0.72	7.23	12.05	-0.004	-0.01	120,000	49,000
Hercules-Glades	MO							-0.003	-0.0004		
Mingo	MO							-0.003	-0.0004		
Upper Buffalo	AR							-0.003	-0.0004		
Voyageurs	MN	0.37	0.37	0.95	0.38	3.81	6.35	-0.006	-0.002	23,000	68,000
Wichita Mountains	OK	0.21	0.21	0.40	0.16	1.61	2.68	-0.001	-0.005	75,000	15,000
Mammoth Cave	KY							-0.005	-0.001		
Sipsey Wilderness	AL							-0.007	-0.001		
Isle Royale	MI	0.35	0.35	0.92	0.37	3.67	6.12	-0.006	-0.002	21,000	64,000
Badlands	SD	0.99	0.99	1.93	0.77	7.73	12.88	-0.008	-0.001	45,000	360,000
Great Sand Dunes	CO	0.68	0.68	1.02	0.41	4.07	6.78	-0.02	-0.003	12,000	82,000
Lostwood Wilderness	ND	1.82	1.82	3.96	1.58	15.85	26.41	-0.008	-0.01	83,000	66,000
Rocky Mtn Nat'l Park	CO	0.59	0.59	0.94	0.37	3.74	6.24	-0.02	-0.007	11,000	31,000
Salt Creek	NM	2.05	2.05	2.77	1.11	11.09	18.49	-0.08	-0.01	9,400	75,000
Theodore Roosevelt	ND	1.00	1.00	2.77	1.11	11.07	18.45	-0.008	-0.01	45,000	36,000
Wheeler Peak	NM	0.45	0.45	0.63	0.25	2.54	4.23	-0.08	-0.01	2,000	16,000
White Mountain	NM	0.67	0.67	0.90	0.36	3.60	6.00	-0.08	-0.01	3,000	24,000
Wind Cave	SD	0.85	0.85	1.60	0.64	6.39	10.65	-0.008	-0.001	39,000	310,000

**Wichita Mountain
SO4/EC/OC AOI-1**



Control Analysis Summary

- AOI Level 1 identified per pollutant
- All sources in AOI-1 identified
- Controls evaluated based on cost and needed reductions
 - Cost and controls come from EPA's AirControlNET
 - Needed reductions estimated from modeling results, extinction monitoring, and the reconstruction equation
- Recommendation of control scenario to evaluate provided to CENRAP modeling workgroup

KDHE BART Update

- Draft BART screening protocol finished
 - Sent to EPA, FLMs, and BART-eligible sources mid-April (4/13/2006)
 - Utilizes CENRAP-developed meteorological inputs
 - Those sources with modeled impacts < 0.5 dv will not be subject to further BART analysis
 - Those sources that model > 0.5 dv will need to do additional modeling
 - Model out with refined modeling
 - Continue full BART process

KDHE BART Update (cont'd)

- Initial modeling results indicate 8 out of 19 sources modeled will need additional modeling or a full BART analysis
- Sources with impacts > 0.5 dv should...
 - Contact KDHE for guidance in developing a BART modeling protocol
 - KDHE-approved protocol will be required
 - *Note EPA and FLMs will also review protocol*
 - Perform a full BART analysis

Timelines

- Regional haze
 - Natural visibility conditions by 2064
 - First RH SIP due December 2007
 - Reasonable progress through 2018
 - SIP due every 10 years thereafter
 - Progress demonstrations every 5 years
 - Baseline for current visibility 2000–2004
 - Future year visibility calculated from 2013-2018
 - Controls implemented by 2013 to stay on glide path

Timelines (cont'd)

- The initial Regional Haze SIP
 - RH SIP due December 17, 2007
 - Must have enforceable controls in SIP
 - In the form of a permit or agreement with enforceable limits for source-specific BART
 - Must include implementation schedule
 - 30-day response to comments
 - 30-day public comment period for SIP
 - 30 days for internal KDHE review and public notice preparation
 - 180 days for PSD permit (if needed)
 - So, by March 2007 should have BART analysis complete and permits or agreements in place

Next Steps for KDHE

- Continue CENRAP participation via ICS and Modeling workgroups
 - Identify any additional controls beyond BART
- Work with potential BART sources on refined modeling
- Work with remaining BART sources on agreements/permits meeting BART requirements

Comments/Questions

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- Your thoughts/questions/concerns?